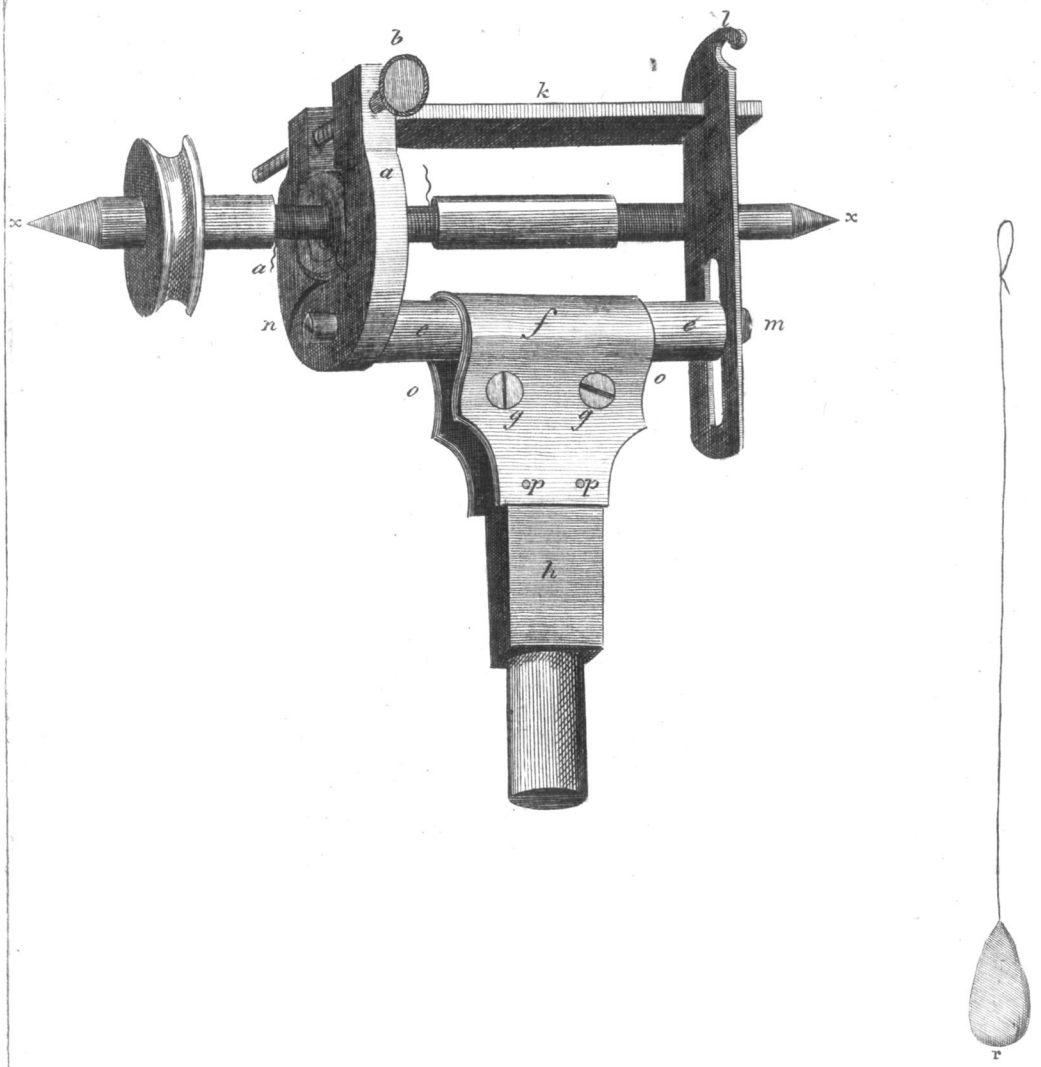
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A METHOD of CUTTING VERY FINE SCREWS, and SCREWS of TWO OR MORE THREADS, &c.

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HAVING lately wanted a micrometer ſcrew for an equatorial inſtrument of twelve inches diameter, made by Mr. Robinſon of Dublin, I ſought in vain among the beſt workmen in this town for one which might anſwer my purpoſe. Screws of the neceſſary fineneſs are not generally uſed in mechanics. Rather, therefore, than ſubmit to the delay and difficulty of obtaining one from London, I determined to endeavour to make one. The machine for cutting ſcrews of this deſcription, uſed by Mr. Ramſden and the firſt aſtronomical inſtrument makers in London, I underſtood to be complex and of great nicety. Such a one would not ſuit me. I thought I might poſſibly hit upon ſome ſhort and ſimple method of making fine ſcrews without it. That which I uſed I beg leave to ſubmit to the Academy, in order that they may make it public, ſhould they think it worthy their attention, and likely to be of ſervice to the practical aſtronomer, who might otherwiſe find it difficult to furniſh himſelf with very fine ſcrews for micrometers. The uſe

of this method is not confined to the forming of very fine ſcrews alone, but may be applied to the cutting of original taps of any ſize and of any number of threads required, as double, triple, &c. for what are called ſwift ſcrews, and that with much leſs trouble and time than workmen are obliged to ſpend in the common methods.

I TOOK a piece of the beſt ſteel wire, of about a quarter of an inch diameter and about two inches long, which I turned perfectly cylindrical at one end, about three quarters of an inch in length to about one eighth of an inch or ſomething more in diameter. I made a nick near the point, and faſtened the end of a very fine piece of ſteel wire to it, and then rolled the wire about the cylinder as far as the ſhoulder, where I faſtened it as at the point. I did not roll the wire quite as cloſe as I could, but left room between one of the revolutions for the edge of a very fine knife. I then ſet the edge of the knife at the beginning of the thread of the wire, and in the direction of the inclination of the threads, and preſſed it down ſo as to touch the ſteel cylinder. I turned the cylinder about with my hand, and guiding the knife by the threads of the wire, by a few turns I made an impreſſion on the ſteel, ſufficient, when I ſtripped off the wire, to ſerve as a guide for the knife to run in and cut the thread to a ſufficient depth.

THIS method, on account of the difficulty of guiding the hand, and determining the proper degree of tenſion to be given to the wire on the cylinder, I found ſubject to a conſiderable variation with reſpect to the fineneſs of the ſcrew produced. For from the ſame wire on different cylinders Mr. Robinſon made

made two taps, one of 80 and one of 110 threads to an inch, and I made two taps, one of 120 and one of 140 threads to the inch; and among theſe taps not above ten or twelve threads could be found ſufficiently regular for uſe. Thoſe, however, as workmen know, were enough for original taps, and from them by the uſual methods I formed four very good taps of the fineneſs I have mentioned. In this method I was alſo ſubject to another inconvenience, which was that I frequently cut the wire before I had made ſufficient impreſſion on the cylinder.

I SHOULD not have mentioned this method, as I have very much improved upon it, only that its great ſimplicity may render it practicable by thoſe who cannot execute conveniently the tool for this purpoſe, of which I now proceed to give the deſcription, together with the manner of uſing it.

(*a a*) is a ſmall vice which is opened or cloſed at pleaſure by the long milled ſcrew (*b*), its jaws at (*c*) are punched or cut very rough at the inſide. It is faſtened on the end of the cylinder (*e e*) by the ſcrew (*n*), and in a plane perpendicular to the axis of the cylinder. At the other end of the cylinder (*e e*) is fixed a fine knife (*d*), turning up with a hook (*l*), and having in it a long ſlit (*s s*) by which it may be puſhed on the ſcrew (*m*), ſo that any part of the edge which is beſt may be applied to cut the ſcrew. The cylinder (*e e*) turns freely on its axis, and ſlides in the direction of its axis backwards and forwards (but without ſhake) in the ſocket (*f*), which

is made of a piece of braſs hammered about it, and capable of being more or leſs cloſed at (*o*) by the ſcrews (*g g*); the ends of this braſs ſocket are rivetted at (*p p*) to the ſolid piece (*h*), which fits the hole of the reſt of a common clockmaker's turn-bench.

THE bar (*k*) is joined to one ſide of the vice (*a a*), and extends acroſs to the knife which drops into the cut (*t*) in the bar, and is thus kept ſteady and parallel to the vice.

THE ſteel of which is to be made the original tap is to be prepared as at (*x x*), the end is to be truly turned and poliſhed, and at the diſtance of the length of the cylinder (*e e*) a part of it is to be turned truly cylindrical, with two ſhoulders, between which the wire of the ſize deſired is to be lapped as tight and as cloſe as it will go, taking care that the threads do not run too obliquely, but making them at each revolution advance on the ſteel cylinder only their own thickneſs.

A BIT of lead about double the length of the jaws of the vice, and about the tenth of an inch thick, is now to be bent about the wire on the ſteel; the tool is to be fixed in the place of the reſt of the turn-bench, and puſhing it near the ſteel wire, the vice is to be faſtened on the lead ſo tight as to make on it an impreſſion of the thread. The knife is then to be let down into the notch of the bar (*k*), and the cylinder (*e e*) is to be adjuſted parallel to the ſteel. The edge of the knife will touch the end of the ſteel, the weight (*r*) being hung on the hook, and when the ſteel is turned about by the hand, or by a bow,

bow, it will cut exactly a ſcrew, the threads of which will be at the ſame diſtance as thoſe of the wire on the ſteel; becauſe the wire ſerves as an outſide ſcrew and the lead as a ſcrew at the inſide; ſo that whatever motion the vice receives from this cauſe in the revolutions of the ſteel is communicated by the bar (*e e*) to the knife, the edge of which cuts the threads on the poliſhed end of the ſteel which is intended for the original tap.

If double threads, &c. are required, there muſt be an adjuſtment by which the knife may be moved the thickneſs of each additional thread, which may be eaſily effected by collets or by an adjuſting ſcrew. The wire is then to be lapped on the cylindrical ſteel, in a double or triple, &c. inſtead of a ſingle thread, taking care that it ſhall be diſpoſed evenly and well faſtened.